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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,991	07/21/2003	Volker Formanski	8540G-000163	5491

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EXAMINER	
PARSONS, THOMAS H	
ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,991	FORMANSKI ET AL.	
	Examiner	Art Unit	
	Thomas H. Parsons	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,8-12,14 and 16-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-6, 8-12, 14, 16-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

This is in response to the Amendment filed 2 December 2005.

(Previous) ***Claim Rejections - 35 USC § 103***

1. The rejections of claims 1, 3-6, 8-12, 14, and 16-22 under 35 U.S.C. 103(a) as being unpatentable over Benz et al. (5,645,950) in view of Scheffler et al. (4,859,545) have been maintained as set forth below.

(New) **DETAILED ACTION**

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 3-6, 8-12, 14 and 16-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1, 8, 14 and 20 state that the cathode feed back gas is regulated, or adjusted or controlled independently of the cathode supply gas, which is not supported by the instantly specification.

The specification in paragraphs [0029]-[0030] states [0029] "To resolve the limitations of humidification by water injection alone, humid cathode exhaust gas is fed back or is recycled to the compressor 22 through a feedback conduit 32. The feedback conduit 32 is connected to the suction inlet 26. A metering device 34 controls the rate of flow of the feedback gas to the suction inlet 26. Fresh air and the feedback gas are mixed in the suction inlet 26 and are drawn into the compressor 22....A controller 40 communicates with the compressor 22, the injector 30 and the metering device 34. The controller 40 regulates the relative humidity of the gas supplied to the cathode side of the fuel cell stack 12. The controller 40 controls the amount of air injected into the compressor 22. The controller 40 controls the compression pressure of the compressor 22 based on the amount of injected water to enable complete vaporization of the water... Further, the controller 40 adjusts the metering device 34 to control the rate of flow of the feedback gas to the suction inlet 26." The specification does not support regulating, or adjusting or controlling the cathode feed back gas independently of the cathode supply gas.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-6, 8-12, 14 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benz et al. (5,645,950) in view of Scheffler et al. (4,859,545).

Claim 1: Benz et al. in Figure 1 disclose a fluid flow system to adjust a humidity of a gas supplied in a fuel cell system, comprising:

a fuel cell stack (12) having a cathode inlet and a cathode exhaust (col. 2: 8-12);

a compressor (6) that draws in fresh gas (3) and compresses the gas therein; and

an injector (10) injecting water into the gas within the compressor, the compressor supplying the gas to the cathode inlet; and

a controller that control the compressor and the injector to adjust the humidity. See col. 2: 8 - col. 3: 15, and col. 3: 48 - col. 4: 12.

Benz et al. do not disclose a compressor that draws in a mixture of fresh gas and humidified exhaust gas from the cathode exhaust and compresses the mixture therein, a metering device to adjust the flow of cathode exhaust to the compressor, and a controller that controls the metering device.

Scheffler et al. in Figure 1 disclose a cathode exhaust recycle loop (24) extending from the cathode exhaust line (20) to the cathode inlet line (18) (col. 2: 9 – 50), a metering device (32) to adjust a flow of cathode exhaust gas to the compressor (col. 2: 32-34), and a controller (34, 33) that controls the metering device (28)(col. 2: 44 - col. 3: 9). The Benz et al. combination would obviously provide the claimed controller that controls the metering device, the injector and the compressor to adjust the humidity. Further, the metering device 32 would obviously control the flow of cathode exhaust by virtue of controlling (via controller 34 and 33) the flow of fresh air entering the cathode inlet.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Benz et al. by incorporating the cathode

exhaust recycle loop of Scheffler et al. because Scheffler et al. teach a cathode exhaust recycle loop that would have lessened or eliminated the incidence of oxygen starvation of individual cells in a stack at lower power levels thereby improving the overall performance of the entire stack.

Further, the Benz et al. combination would obviously provide the claimed compressor that draws in a mixture of fresh gas and humidified exhaust gas from the cathode exhaust and compresses the mixture therein and provide water injection into the mixture.

Further, in light of the teachings in Benz et al. and Scheffler et al. to a controller for controlling the entire fuel cell system, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the controller of the Benz et al. combination to provide for controlling cathode exhaust independent of the fresh gas.

Claims 3-6: The limitations set forth therein have been considered, and construed as process limitations that add no additional structure to the Benz et al, combination. Further, because the Benz et al. combination is structurally the same as instantly claimed, and provides a controller in communication with the compressor, the injector, and metering device, it appears capable of providing the claimed process limitations.

Claim 8: The rejection of claim 8 is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a humidity of a cathode supply gas to a cathode side of a fuel cell stack, comprising:

mixing the cathode supply gas with a feedback gas from the cathode side to effect a relative humidity of the cathode supply gas;

injecting water into the cathode supply gas to further effect the relative humidity of the cathode supply gas; and

compressing the cathode supply gas in a compressor.

Further, in light of the teachings in Benz et al. and Scheffler et al. to a controller for controlling the entire fuel cell system, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the controller of the Benz et al. combination to provide for adjusting a flow of the feedback gas based on a desired relative humidity of the cathode supply gas.

Claim 9: The rejection is as set forth above in claim 8 wherein further the Benz et al. combination discloses that the cathode supply gas is air. See Benz et al., Figure 1, air supply line 3, and Scheffler et al., Figure 1, blower 30 for supplying cathode air via cathode inlet 18.

Claim 10: The rejection is as set forth above in claim 8 wherein further Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).

Claim 11: The rejection is as set forth above in claim 8 wherein further Benz et al. disclose that vaporizing is achieved using heat generated through compression (col. 3: 4-6).

Claim 12: The rejection is as set forth above in claim 8 wherein further Benz et al. disclose adjusting a compression pressure of the compressor based on a quantity of water to vaporize the water therein (col. 3: 63- col. 4: 5).

Claim 14: The rejection of claim 14 is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a relative humidity of a gas supplied to a cathode side of a fuel cell stack, comprising:

controlling a flow of feedback gas from the cathode side to a compressor to adjust the relative humidity of the gas (see claim 13 above);

vaporizing water in the compressor to further adjust the relative humidity of the gas (Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).;

and discharging the gas at a pressure sufficient for use in the fuel cell stack.

Benz et al. disclose that the water may be injected upstream of the compressor which has been construed as providing water injection into the compressor.

Claim 16: The rejection is as set forth above in claim 8 wherein further Benz et al. disclose that vaporizing is achieved using heat generated through compression (col. 3: 4-6).

Claim 17: The rejection is as set forth above in claim 8 wherein further Benz et al. disclose adjusting a compression pressure of the compressor based on a quantity of water to vaporize the water therein (col. 3: 63- col. 4: 5).

Claims 18 and 19: The rejection is as set forth above in claim 8 wherein the Benz et al. combination discloses a feedback gas but is silent as to a saturated or super-saturated feedback (i.e. recycled cathode exhaust gas). However, because the method of the Benz et al. combination is the same as that instantly claimed, it would obviously provide a saturated or super-saturated feedback.

Claim 20: The rejection is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a relative humidity of a gas, comprising:

controlling a flow of feedback gas to a compressor to adjust said relative humidity of said gas (see claim 13 above); and

vaporizing water injected into the compressor to further adjust the relative humidity of the gas Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).

Claims 21 and 22: The rejection of claims 21 and 22 are as set forth above in claims 18 and 19.

Response to Arguments

6. Applicant's arguments filed 2 December 2005 have been fully considered but they are not persuasive.

The Applicants argued that the Examiner appears to be using hindsight to find motivation for the combination.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The Applicants argue that in order to find an invention obvious in light of a combination of references, there must be something present in the teaching of those references to suggest the claimed invention to one skilled in the art.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, Scheffler et al. have been relied upon for its teaching that it is known to recycle a controlled flow of cathode exhaust to the cathode inlet of a fuel cell. The motivation to combine comes not only from this teaching but also because Scheffler et al. teach that cathode exhaust recycle would improve fuel cell stack performance. Further, Benz et al. are concerned with oxygen demand (content) (Benz et al., col. 4: 32-49) wherein both Benz et al. and Scheffler et al. determine air flow by sensors 34 and 33, respectively.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Benz et al. by incorporating the cathode exhaust recycle loop of Scheffler et al. because Scheffler et al. teach a cathode exhaust recycle loop that would have improved the oxygen demand or content thereby lessening or eliminating the incidence of oxygen starvation of individual cells in a stack at lower power levels thereby improving the overall performance of the entire stack.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas H Parsons
Examiner
Art Unit 1745

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PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER